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ADDOMINAL CAVITY WITH HOMOTRANSPLANTION OF  
PRESERVED PERITONEUM

- USSR -

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THE PROPHYLAXIS AND THERAPY OF ADHESIONS OF THE  
ABDOMINAL CAVITY WITH HOMOTRANSPLANTATION OF  
PRESERVED PERITONEUM

Following is a translation of an article by A. S. Kalugin,  
of the Hospital Surgical Clinic (director: Professor  
I. B. Oleshkevich), of the Vitebsk Medical Institute,  
in Zdravookhraneniye Belorussii (Public Health of Belorussia), Vol. V., No. 1, Minsk, January 1960, pages 15-17

Not infrequently surgeons, while performing operations in the abdominal cavity, encounter a pathologically changed peritoneum in the form of adhesions or, during the course of an operation, are forced to damage considerable areas of the peritoneum, thus causing the development of adhesions during the postoperative period. In present-day surgery there are many proposals that have the aim of preventing the formation of adhesions after operations on organs of the abdominal cavity.

With the aim of combatting the adhesive process, the pathologically changed peritoneum was replaced by other homogenous and heterogenous tissues. But none of the means proposed is an effective one.

We decided to carry out an experimental study of the properties of fresh and preserved peritoneum in cases of intraperitoneal adhesions. Forty experiments were conducted on 40 dogs. Use was made of autotransplantation of fresh peritoneum and omentum, and heterotransplantation and homotransplantation of fresh and preserved peritoneum. In all the experiments the peritoneum was transplanted onto deserosed sectors of the intestine or onto the place where adhesions were excised, and was fastened with knotted silk sutures.

Of the 14 experiments with homotransplantation of preserved peritoneum, in no instances was an adhesive process detected over a period of 8 days to 1.5 years, whereas the other types of transplantation did not protect against adhesions.

We preserved the peritoneum in three different liquids: in physiological solution of sodium chloride, in citrated blood of the recipient, and in a complex solution--blood stabilizer (formula #7 of the TsOLIPK). The composition of the solution is: distilled water, 100 milliliters; acid sodium citrate, 2.0; glucose, 3.0; sodium sulfacyl, 0.5; and rivanol, 0.003 grams. According to our observations, the best preservative was solution #7, in which the peritoneum can be kept up to 1.5 months at temperatures of 4-8° above zero.

When operating on the patients, we used the peritoneum of hernial sacs as the plastic material. The "donors" blood was studied for the Wassermann, Kahn, and Sachs-Witebsky reactions. Peritoneum that had been preserved for 15-20 days was used for the transplantation, with the exception of individual instances when peritoneum that had been preserved 1 1/2 months was used.

The homotransplantation technique is as follows. The homotransplant was removed from the flask with the preservative and, by means of Pean clamps, was slightly stretched at the edges. The peritoneum thus stretched was placed with the mesothelium facing out onto the deserosed sector of the organ and fastened with individual knotted sutures of fine catgut. The transplant was irrigated with a penicillin solution (200,000-250,000 units), and the abdominal cavity was sewn up tightly. The dimensions of the transplant varied from 5 x 6 to 9 x 11 centimeters.

In the material used in our experiments we did not notice any difference in the effectiveness of the transplantation depending upon the blood group of the recipient and the donor. Patients that were given homotransplantation of preserved peritoneum without the consideration of the blood group to which they belonged felt the same as those in which that fact was taken into consideration.

We used a pilocarpine test as an auxiliary means of diagnosing the adhesions. This test consisted of the following. Thirty-five to 40 minutes before the operation, a one milliliter of a one-percent pilocarpine solution is administered subcutaneously to the patient, with the patient being under the physicians's observation. If there are any adhesions in the abdominal cavity, the patient complains of intensified pains in the stomach, with the pains being localized. For example, with symptoms of chronic appendicitis, when the patient had adhesions the pains are usually felt in the right-hand iliac region. Not infrequently one can hear growling in the stomach, and sometimes vomiting occurs. If the patient presented these symptoms, we considered the pilocarpine test to be positive. Twenty-four of the 25 patients had a positive test.

We used homotransplantation of preserved peritoneum in cases of the following diseases: adhesive intestinal obstruction (6 patients), chronic appendicitis, with existence of adhesions (17); and gastric ulcer (2). The patients were aged 12 to 66 years. There were 12 men patients and 13 women. Fifteen of the patients had previously undergone a laparotomy and ten of the patients had never been operated on. They all complained of pains in the stomach. The six patients with adhesive intestinal obstruction had pains in the form of acute seizures, with sharp swelling of the stomach; in the two patients with chronic adhesions of the abdominal cavity, these symptoms were weakly expressed; and in 17 patients the pains were dull and were accompanied at times by swelling of the stomach and loss of appetite.

For purposes of illustration we shall cite two case histories.

1. M., male 12 years old, admitted with complaints of acute pains in the stomach, vomiting, tympanites, and build-up of gases. Had had pains for two days. Haddbeen operated on a year earlier for incarcerated right inguinal hernia.

Patients condition of average severity. Temperature 37.6°. No particular symptoms for heart or lungs. Pulse 88, rhythmic. Tongue coated with white film, rather dry. Stomach sharply swollen, painful when palpated. Val' symptom positive. Digital exploration of rectum: ampulla empty, sphincter weakened. Klyber Calyx (Chashi Kloyber) revealed by x-ray. Blood analysis: hemoglobin 68%, erythrocytes 4,200,000, leukocytes, 12,000, young, 2%; bac. 1%, lymph polymior phenuclear neutrophils 61%, monocytes, 6%, erythrocyte sedinentation reaction 20 mm. Urine unchanged. Chlorides in blood 370 mg/percent, sugar 94 mg/percent, residual nitrogen 36 mg/percent, catalase in blood 7.6 u units. Diagnosis, acute intestinal obstruction resulting from adhesions.

Siphon clysmas and paranephral blockade did not produce any positive results. Pilocarpine test before the operation was positive.

Emergency operation on the day of admission. Under local infiltration anesthesia, the abdominal cavity was opened with a median section above and below the umbilicus. Swollen loops of the small intestine were presented. Inspection of the abdominal cavity revealed a rope-like adhesion 50 centimeters from the ileocaecal angle. Adhesion had created contraction of the ileum. Adhesion originated at the radix of the small intestine.

Adhesion was excised, as a result of which the intestinum tenue was deserosed on an area 5 x 6 centimeters. The serosa defect was closed by means of preserved parietal peritoneum that had been preserved for 25 days. Transplant was fastened with individual knotted catgut sutures. The transplant area was irrigated with a penicillin solution. Abdominal cavity closed tightly.

Postoperative period proceeded smoothly. The wound healed with primary tension. Patient was released to home in satisfactory condition on the fifteenth day. Blood condition upon release: hemoglobin 78%, erythrocytes 460,000, 6mm an hour; l. 6,700; young 1%, bac. %, polymorphonuclear neutrophils 64%, lymphocytes 21, monocytes 4%; chlorides in blood 580 mg/percent; sugar 99 mg/percent, residual nitrogen 31 mg/percent, blood catalase 10.7 units, pilocarpine test negative.

Two years later the patient was examined, was found in good condition, did not feel any pains in his stomach.

2. G., female, 35 years old, admitted 19 June 1958 with complaints that she had had dull pains in the right iliac region for 8 years. General condition satisfactory, temperature 36.6°, pulse 72, rhythmic. Stomach undistorted and participated in act of breathing. During palpation complained of pains in the entire right iliac region. Shchetkih-Blyumberg symptom negative. Sitkovskiy and Obratsov symptoms weakly positive.

Blood: hemoglobin, 76.7%, erythrocytes 420,000, leukocytes 6000, bac 2%, polymorphonuclear neutrophils 65%, lymphocytes 14%, monocytes 2%, erythrocyte sedimentation reaction 2 mm. Urine unchanged. Chlorides in blood 570 mg/percent, sugar 98 mg/percent, residual nitrogen 36 mg/percent, catalase 4.9 units.

Pilocarpine test carried out prior to the operation proved to be sharply positive.

Diagnosis -- chronic appendicitis.

Operation on 22 June. Under local anesthesia the abdominal cavity was opened in layers by the D'yakonov-Volkovich method. Wound presented the intestinum caecum, joined to the parietal peritoneum by pellicular adhesions. The pellicular adhesions were disconnected bluntly and partially by acute method. The vermiform appendix was situated retrocaecally and was deformed by the adhesions. As a result of the separation of the appendix and the disconnecting of the adhesions, the antero-lateral surface of the intestinum caecum was deserosed on an area of 4 x 8 centimeters. A typical appendectomy was carried out, with the fastening of the appendix stump with a pouch-like suture and Z shaped sutures. The deserosed area of the caecum was closed by preserved parietal peritoneum that had been preserved for a month. The transplant was irrigated with 200,000 units of penicillin. The abdominal cavity was closed tightly. The postoperative period proceeded smoothly. The sutures were removed on the seventh day and the wound healed with primary tension.

Six months later the patient felt well, able to work, and had no further pains in the stomach. The postoperative scar was healed. Blood and urine analysis normal, pilocarpine test negative.

The observation period for patients on whom homotransplantation of preserved parietal peritoneum is carried out is from 6 months to 2.5 years. They all feel satisfactory. In just one patient, one month after the operation, there appeared pains in the stomach and dyspeptic disorders (diarrhea) as a result of chronic appendicitis accompanied by adhesions. We explain this by the colitis that the patient had had before she was operated on.

### Conclusions

1. Under experimental conditions, better results were obtained when transplanting preserved parietal peritoneum that had been kept in blood stabilizer for 3-4 weeks at a temperature of 4-8° above zero. In the 14 experiments in homotransplantation with preserved peritoneum we did not observe the development of adhesions in a single case, whereas other types of transplantation did not prevent the development of adhesions.

2. In clinical practice, when serosa defects were detected we used homotransplantation of preserved peritoneum for 25 patients. The observations of the patients during the postoperative period for periods of from 6 months to 2.5 years convince us of the value of this method of prophylaxis and therapy of intraperitoneal adhesions.

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